Guidance for the Analysis and Reporting of Lead and Copper Tap Water Samples

Addendum #2

(Revision 1)

to the

Quality Assurance Project Plan (QAPP) for the Texas Commission on Environmental Quality Public Water System Supervision (PWSS) Program Relating to the Safe Drinking Water Act

(Revision 12)

Effective Date: 11/4/2017



List of Acronyms

Аскоруст	Definition	
Acronym		
CA	corrective action	
CFR	Code of Federal Regulations	
COC	chain of custody	
DQO	data quality objective	
DWW	Texas Drinking Water Watch	
EDD	electronic data deliverable	
EPA	Environmental Protection Agency	
ID	identification	
L	liter	
LCR	Lead and Copper Rule	
LCRCOC	Lead and Copper Rule Chain of Custody	
МВ	method blank	
MDL	method detection limit	
mg/L	milligrams per liter	
mL	milliliter	
MRL	method reporting limit	
NTU	nephelometric turbidity units	
TNI	The Nelac Institute	
PDF	portable document format	
PWS	public water system	
PWSS	Public Water System Supervision	
QA	quality assurance	
QAPP	quality assurance project plan	
QC	quality control	
SDWA	Safe Drinking Water Act	
SDWIS	Safe Drinking Water Information System	
SOP	Standard Operating Procedure	
TAC	Texas Administrative Code	
TCEQ	Texas Commission on Environmental Quality	

Approval Page – PWSSP QAPP, Addendum #2

The following TCEQ individuals listed on this page are signatories to this document because they are responsible for TCEQ oversight and quality assurance of the work described.

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Introduction

The Texas Commission on Environmental Quality (TCEQ) regulates lead and copper based on levels detected in drinking water at public water system (PWS) taps. Laboratories that generate data for this project will assist the TCEQ in implementing the Safe Drinking Water Act (SDWA) by analyzing drinking water samples for lead and copper and reporting results according to defined protocols. The TCEQ uses the data to make compliance determinations, identify violations, and take assistance actions, thereby protecting public health.

To submit tap water lead and copper data to the TCEQ Public Water System Supervision (PWSS) Program for compliance purposes, laboratories must be accredited to analyze lead and copper in drinking water. Laboratories must also follow US Environmental Protection Agency (EPA) allowable drinking water methods. In addition, they must comply with the criteria and procedures described in this document.

The following sections establish program–specific requirements for tap water sample handling, analysis, quality control (QC), data validation, and reporting. These requirements are written to be consistent with federal regulations and state rules including 40 Code of Federal Regulations (CFR) Part 141, Subpart I, and 30 Texas Administrative Code (TAC) §290.117.

This document is included in the TCEQ PWSS Program Quality Assurance Project Plan (QAPP) which is reviewed and approved by the EPA. Laboratories that submit data to TCEQ for use in compliance under the this Program are subject to both the TNI Standard as well as the EPA *Manual for the Certification of Laboratories Analyzing Drinking Water* (5th Ed.). The TCEQ may refuse to accept data and analyses from laboratories in order to maintain compliance with programmatic requirements and specifications.

Requirements in this document are not intended to supersede other requirements which apply to environmental laboratories. Requirements for training, supplies, equipment maintenance, internal assessments, analysis, etc. are addressed in quality manuals and standard operating procedures and are reviewed by the TCEQ as part of the laboratory accreditation process.

Note: PWSs that exceed the lead and copper action levels are required to monitor lead and copper at <u>entry points</u> to the distribution system. These entry points involve different locations and different sample point ID numbers in order to report the analytical results. Laboratories should contact the Lead and Copper Program for information regarding these results. In addition, all large water systems, and all small and medium-size systems that exceed the lead or copper action levels are also required to monitor water quality parameters in addition to lead and copper. The analyses of these parameters are addressed in a similar document, entitled Guidance for the Analysis and Reporting of Water Quality Parameters under the Lead and Copper Rule (LCR).

The current version of this document is located on the TCEQ web site at: https://www.tceq.texas.gov/drinkingwater. For information on the TCEQ's Lead and Copper Program, refer to this web page. For specific information related to this QAPP Addendum, contact the TCEQ at (512) 239-4691 and ask for the PWSS Program QA Manager.

Quality Objectives and Criteria

The lead and copper data collected for the TCEQ Lead and Copper Program are used to determine the compliance status of PWSs. As a result, the TCEQ can provide better protection of the health of all Texas citizens currently served by a PWS and all those who consume water from such systems.

The data quality objectives (DQOs) described below apply to all laboratories using this guidance document. They ensure that the type and quality of the analytical data generated meet the goals of the SDWA and support defensible compliance decisions and actions by the TCEQ.

DQOs

Sensitivity

Sensitivity refers to the ability of an instrument or method to discriminate between different levels of an analyte by producing a different response. Sensitivity requirements specific to the analysis of drinking water include method detection limits (MDL) and method reporting limits (MRL). MDLs and MRLs for are defined in this document in the Section - Lead and Copper Analysis.

Bias

Bias refers to the systematic distortion of a measurement which makes it different from the true value. A measurement is considered unbiased when the value reported does not differ from the true value. Bias is controlled by the use of blanks, proficiency testing samples, calibration standards, quality control samples, etc. To control for bias, acceptance criteria and corrective actions for specific quality control samples listed in the approved analytical methods are implemented by the laboratory. Results are compared against criteria defined in the methods and used during the evaluation of analytical performance.

Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. It is a measure of agreement among replicate measurements and is an indication of random error.

Precision is controlled by the use of split and/or duplicate samples. To control for precision, acceptance criteria and corrective actions for specific quality control samples listed in the approved analytical methods are implemented by the laboratory. Results are compared against criteria defined in the methods and used during the evaluation of analytical performance.

Representativeness

Representativeness refers to the degree to which the data accurately represents the frequency distribution of a specific variable in the population. Sample site selection, the appropriate sampling protocols, adherence to the sampling schedule, and use of approved analytical methods as defined in this document and all referenced documents ensure that the measurement data represents the conditions at the sampling site.

Comparability

Comparability refers to the degree in which methods or data sets are considered to be

similar. Confidence in the comparability of data sets for drinking water compliance is based on approved sampling and analysis methods, and quality assurance protocols in accordance with requirements described in this document, and all referenced documents. Comparability is also guaranteed by standard reporting protocols as described in this document.

Completeness

The completeness of the data refers to the relationship of how much of the data is available for use compared to the total potential data. To determine compliance, 99.9% must be collected and analyzed as enforcement may be necessary when results are not reported. Results may not be reported when a sample is not collected or there are sample or data loss due to insufficient sample volume, broken or lost samples, laboratory issues, etc. The processes in place for these situations as described in this document require these occurrences be reported to the PWS and/or the TCEQ so replacement samples can be recollected as soon as possible.

Data Integrity

Data collected and reported to the TCEQ Lead and Copper Program are managed in such a way to ensure the confidentiality, integrity, and availability of data and information. Data management policies and procedures ensure data and information are recoverable and only used for their intended purposes.

Compliance

All rules, regulations, and requirements associated with this guidance document have been developed to be consistent with state rules and federal regulations pursuant to the SDWA. Adherence to this document will ensure data are collected, analyzed, and reported according to statute.

Sample Handling and Custody

Sample Collection

Homeowner Tap Sample Collection Procedures are located on the TCEQ website at http://www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html. The PWS is responsible for (1) obtaining sample containers from the laboratory (2) providing the procedures and the sample bottles to the homeowners, (3) coordinating the sample collection event, (4) arranging for sample pick-up, (5) making sure the samples were collected correctly (e.g., from an inside sink at least six hours after the last time it was used, etc.), (6) submitting the sample(s) to an accredited laboratory for analysis, and (7) ensuring the results are reported to the TCEQ.

Sample Label

A sample label is provided with the *Homeowner Tap Sample Collection Procedures*. This label should be affixed to the bottles by the PWS at the time of collection. Alternatively, the PWS may write the sample label information directly on the bottle. Laboratories may also provide their own labels. These alternatives are acceptable as long as the required information is included on the bottle/label, with indelible ink, as follows:

- sample point identification number and location address
- date and time water was last used

- date and time sample was collected
- which inside sink was used

The PWS is responsible for filling out the sample label information at the time of collection. Laboratories should not fill out the labels ahead of time for the PWS.

LCR Chain of Custody

PWSs are required to complete and submit a LCR Chain of Custody (LCRCOC) Form 20683 with their lead and copper samples. The LCRCOC Form 20683 is included in Exhibit 1. The LCRCOC must be filled out completely with all required information, including, but not limited to sample location, time and date the sampling tap was last used, and time and date of collection. See Table 1 for all required information.

Table 1 LCRCOC Form Required Information

Field	Description	Required
PWS ID #	PWS Number	Y
PWS Name	PWS name (as it appears on DWW)	Y
PWS Contact Name	Name of owner, collector, operator, etc.	Y
PWS Contact Phone #	Phone # of contact name with area code	Y
Compliance / Non- compliance	If samples are compliance or non-compliance when submitted to the laboratory	Y
Sample Point ID	LCR001, DS01, EP001, etc.	Y
Sample Location	Address where sample is taken AND sink	Υ
Water Last Used Date	MMDDYY	Y
Water Last Used Time	HHMM (24 hour clock) 12:01, 05:30, 18:45, etc.	Υ
Sample Collected Date	MMDDYY	Υ
Sample Collected Time	HHMM (24 hour clock) 12:01, 05:30, etc.	Υ
Name / Signature	Name and signature of PWS official	Y
Date signed	Date PWS signs off on LCRCOC	Y

The LCRCOC may replace the laboratory's COC at the laboratory's discretion. In this case, the receipt and relinquish information at the bottom of the form must be completed. If samples are subcontracted, then the LCRCOC must be transmitted with the sample.

Sample Point Identification Numbers

Texas Drinking Water Watch (DWW) http://dww2.tceq.texas.gov/DWW/ has the PWS sample sites listed under SAMPLE POINTS. The sample point ID numbers always begin with LCR001 and can go to LCR100 depending on the size of the public water system. Sample locations are not available on DW website; contact TCEQ for sample locations (addresses).

Examples

BOTTLE 1 = LCR001 = 123 Main Street BOTTLE 2 = LCR002 = 456 Sugar Street

Preservation, Containers, and Sample Holding Time

For the determination of total recoverable elements in aqueous samples, samples are not filtered, but acidified with (1:1) nitric acid (HNO₃) to pH <2 (normally, 3 mL of (1:1) acid per liter (L) of sample is sufficient for most drinking water samples). To

avoid the hazards of strong acids in the field, transport restrictions, and possible contamination, samples should be returned to the laboratory as soon as possible, and no later than 14 days of collection, and acid preserved upon receipt in the laboratory. Following acidification, the sample must be mixed, held for 16 hours, and then verified to be pH less than 2 just prior to withdrawing an aliquot for processing or "direct analysis". If for some reason, such as high alkalinity, the sample pH is verified to be greater than 2, more acid must be added and the sample held for an additional 16 hours until verified to be pH less than 2.

Table 2 summarizes preservation and container requirements for lead and copper samples.

Table 2 Preservation and Containers for Lead and Copper Samples

Parameter	Preservation	Preservation Time	Sample Size ¹	Type of Container ²
Lead (Analyte Code 1030)	HNO ₃ , pH<2	Up to 14 days from collection date	1 L	Wide-mouth, 1 L lab grade plastic with fill line
Copper (Analyte Code 1022)	HNO₃, pH<2	Up to 14 days from collection date.	1 L	Wide-mouth, 1 L lab grade plastic with fill line

¹ If both lead and copper are to be analyzed concurrently, then a 1 L sample is sufficient for both analytes.

Sample Holding Time

Holding time refers to the maximum time that samples may be held after sample collection until they are analyzed and still be considered valid or not compromised. The regulatory analysis holding time for preserved lead and copper samples is six months. To help facilitate the TCEQ requirements for data processing, reporting, and maintaining PWS compliance, the TCEQ requests that samples be analyzed as soon as possible after receipt and no later than 28 days from the time of collection. When implementing this request, laboratories should be mindful that the monitoring periods end each year on June 30, September 30, and December 31. Federal and state rules require that all data be received by the TCEQ no later than 10 days after the end of the monitoring period. If samples are submitted to the laboratory late in the monitoring period, the available holding time may be cut short. To avoid this situation, the TCEQ requests that PWSs coordinate with property owners to ensure samples are submitted early in the reporting period.

Rejecting Samples at Time of Laboratory Receipt

Laboratories may reject samples upon receipt if samples and/or paperwork do not comply with requirements defined in this document. Reasons for rejecting samples correspond to rejection codes listed in Table 6. They include but are not limited to:

- Insufficient information (e.g., Issues with the completed LCRCOC Form 20683)
 - Handwriting not legible
 - LCRCOC not included with samples at time of laboratory receipt
 - o Discrepancies between the completed LCRCOC Form and sample labels

² Laboratory containers must be provided by the laboratory without preservative

- LCRCOC unsigned by the PWS official
- o Incomplete or missing information
- Not the most current LCRCOC
- Not dated for current year of sampling
- Holding times exceeded
- Wrong container type
- Leaking or broken sample
- Insufficient sample volume

It is extremely important for the laboratory to check the sample documentation very carefully at the time of receipt because both incorrect and insufficient documentation may result in monitoring or reporting violations for the PWS.

Note: The laboratory can use some discretion <u>in assisting</u> the sampling personnel/courier with "fixing" errors in the documentation at the time of receipt in order to avoid the unnecessary recollection of samples. For example, if sampling personnel did not check whether orthophosphate or silica should be analyzed, the laboratory can inform the sample collector/courier, and he/she can check the appropriate sample type, while still on the premises.

The laboratory custodian (or designee), cannot correct or complete the LCRCOC. It is the responsibility of PWS personnel to fill out the form, sign, and date it. Also, under no circumstances can the laboratory modify the form after it has been received, signed, and dated by the laboratory. If there is a question regarding sample receipt or sample rejection, the laboratory should contact the PWSS Program QA Manager for guidance.

Lead and Copper Analysis

Allowable Methods

All drinking water tap samples collected for LCR compliance must be analyzed using TCEQ accredited methods which are allowed by the EPA under the SDWA. Table 3 lists the allowable methods for both lead and copper for which the TCEQ currently maintains accreditation. These methods are subject to change at any time. Laboratories are responsible for maintaining accreditation for the methods they use. For the most updated information on EPA allowed methods and versions, refer to: https://www.epa.gov/dwanalyticalmethods.

Table 3 Approved Analytical Methods for LCR Compliance Samples

Analyte Name & Code	EPA	ASTM	Standard Methods for the Examination of Water and Wastewater
Copper, milligram per liter (mg/L) (Analyte code 1022)	200.5, Rev. 4.2 200.7, Rev. 4.4 200.8, Rev. 5.4 200.9, Rev. 2.2	D1688-07 A D1688-02 A D1688-95 A D1688-90 A	3111 B - 18 th , 19 th , 21 st , 22 nd eds. 3111 B-99 (online ed.) 3113 B - 18 th , 19 th , 21 st , 22 nd eds. 3113 B-99, B-04, B-10 (online eds.) 3120 B - 18 th , 19 th , 20 th , 21 st , 22 nd eds.

Table 3 Approved Analytical Methods for LCR Compliance Samples

Analyte Name & Code	ЕРА	ASTM	Standard Methods for the Examination of Water and Wastewater
		D1688-07 C	3120 B-99 (online ed.)
		D1688-02 C	
		D1688-95 C	
		D1688-90 C	
Lead, mg/L	200.5, Rev. 4.2	D3559-08 C	3113 B - 18 th , 19 th , 21 st , 22 nd eds.
(Analyte code 1030)	200.8, Rev. 5.4	D3559-08 D,	3113 B-99, B-04, B-10 (online eds.)
	200.9, Rev. 2.2	D3559-03 D	
		D3559-96 D	
		D3559-90 D	

Sample Preparation—Total Recoverable Analytes

For the "direct analysis" of total recoverable analytes in drinking water samples containing turbidity less than one nephelometric turbidity units (NTU), the laboratory must treat an unfiltered, acid-preserved sample aliquot using the sample preparation procedure described in the method while making allowance for sample dilution in the data calculation. For the determination of total recoverable analytes in aqueous samples where turbidity is greater than one NTU, sample digestion is required using the procedure described in the method. Samples processed in this way and those "directly analyzed" are reported to the TCEQ using the same analyte codes (1030 for lead and 1022 for copper).

Analytical Sensitivity

Analytical sensitivity refers to the ability of an analytical instrument and/or method to detect and analyze small concentrations of analyte. This is numerically characterized by the determination of detection and reporting limits, and blanks. Aspects of sensitivity as they apply to the PWSS Program are described below.

MDL

The MDL, which is also known as the Limit of Detection, is the minimum concentration of an analyte that can be identified, measured, and reported with confidence that the analyte concentration is greater than zero. MDLs are prepared and analyzed according to method requirements.

MRLs and MRL Verifications

The TCEQ PWSS Program does not use J flagged (i.e., estimated) data to make compliance determinations; therefore the laboratories must comply with MRL requirements defined below and later in the document under the Section, *Reporting Results*.

MRLs are equivalent to the lowest non-zero calibration standard in a multi-point calibration curve. Per federal rule, the MRLs for lead and copper are 0.005 mg/L and 0.050 mg/L, respectively (40 CFR Part 141.89); therefore, the laboratory MRL must be equal to or less than 0.005 mg/L for lead and 0.050 mg/L for copper. Laboratories must run a laboratory fortified blank every analysis day and not report lead and copper at levels

less than the level at which they routinely analyze their lowest standard. For the purpose of the Lead and Copper Program, this check is known as an MRL verification. An MRL verification consists of a sample of deionized water free from the analytes of interest spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes at or near the MRL. It is used to assess the performance of the measurement system at the lower limits of analysis. The acceptance criteria for MRL verification checks must comply with internal laboratory criteria and be documented. The laboratory must locate and fix problems with the MRL verification before continuing if results are out of control.

Method Blank

A method blank (MB) is a sample of matrix similar to the batch of associated samples that is free from the analytes of interest and is processed simultaneously with the samples through all steps of the preparation and analytical procedures. MBs are analyzed at a rate of one per preparation batch. A preparation batch is composed of one to 20 environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. The MB is used to document contamination from the analytical process. Results of MB analyses must be less than the MDL, be less than or equal to $1/10^{\text{th}}$ of the concentration measured in the sample, or conform to method-specific requirements. For example, EPA Method 200.8 has a method blank requirement of <2.2 x MDL.

Reporting Data to the TCEQ

Lead and copper results are reported to the TCEQ as explained in the following sections, this includes (1) the COCs and the analytical test reports, in portable document format (PDF) for the TCEQ Central Records and (2) the electronic data deliverable (EDD).

Note: All compliance data must be reported to the TCEQ. The type of sample (e.g., compliance, special) should never be changed after they have been submitted to the laboratory for analysis.

Submission of Completed COCs and Analytical Test Reports to the TCEQ

The TCEQ retains all analytical data and associated information in its central records for a period of time according to federal and state records retention regulations. Therefore, all laboratories are required to submit the following data and information electronically, as PDFs, at least once a month.

- Copy of the completed LCRCOC Form 20683
- Copy of the laboratory COC (if applicable)
- Copy of all analytical test reports given to the PWS.

Please note that when the documents are scanned, the LCRCOC Form 20683, should be on top. This helps manage the large number of documents received by the TCEQ.

When the PDFs are transmitted to the TCEQ, the analytical test report should be transmitted to the PWS within the same timeframe to help ensure that the TCEQ and the PWS have the same information.

The TCEO needs the following information to successfully code documents which are submitted to the TCEQ's Central File Room. The laboratory can assist the TCEQ by providing this information as described in the examples.

Series Code: PWS

Primary ID: County Code # and Identification #: 7 digits 3+4 (PWS ID #)

Document Type: AC

Document Date: YYYYMMDD (Collection Date)

Document Name: Analysis Report

Example 1:

PWS 1010014 AC 20150928 LCR Analysis Report (printed on paper before scanning, top right corner)

Example 2:

PWS_1010014_AC_20150928_LCR Analysis Report.PDF (electronic file name)

Note that there must be a space between "LCR" and "Analysis" and "Report."

All PDFs should be emailed to the TCEQ's dedicated mail box at <lcrdata@tceq.texas.gov>.

In the event that the laboratory does not have PDF scanning capabilities, send hardcopy data reports and associated information to the following postal address. Laboratories should coordinate with the TCEQ Lead and Copper Program before mailing data and information via the postal service.

Texas Commission on Environmental Quality Attn: Lead and Copper Program MC 155

PO Box 13087

Austin, TX 78711-3087

Analytical Test Reports

Test reports from the laboratory must document the test results clearly and accurately. Test reports should include the information necessary for the interpretation and validation of data by the TCEQ and the PWS. At the very minimum, Lead and copper analytical test reports should include the following even if the laboratory is reporting within its own organization.

- Laboratory name, address, ID number, and phone number
- PWS name, address, ID number, and phone number
- Sample point name, address, and sample point ID number
- Report date
- Laboratory Sample ID
- Date and time of sample collection
- Date and time of sample receipt
- Results with units, dilution factors (if applicable), and relevant data flags
- Numerical results for the MRL and MDL

- Date and time of sample preparation and analysis, and initials of technicians or analysts who performed the work
- Identification of the analytical methods used
- Indication that the result was generated by an accredited laboratory
- Quality control results
- Data comments or case narrative, including information regarding deviations from methods or requirements
- Page numbers
- Name, function, date and signature (or electronic equivalent) of person authorized to approve report
- Statement that the report (or portions of the report) cannot be duplicated, except in whole

Electronic Data Deliverable (EDD)

The EDD must be in a format compatible with State Drinking Water Information System (SDWIS) requirements. Data must be submitted electronically in a TCEQ-approved format (typically MS ACCESS) using two separate files-Sample and Result. The Sample and Result files should be submitted together to the TCEQ at least weekly.

The field structures and requirements for each file are included in this addendum. The TCEQ can provide the laboratory with a "test" database if requested.

Laboratories should validate analyte codes, units, methods, and sampler names against SDWIS prior to submission. If fields are incorrect or missing, the TCEQ will reject the files.

All listed fields must be included in the respective tables in the order listed even if a particular field is not used.

Pass-through laboratories should be noted in [B SAMPLE COMMENTS] in the sample file.

Electronic File Naming Convention

Electronic data deliverables (EDD) should be submitted to the TCEQ with the following file naming convention.

Lab Name_LCR_the date of submittal.

An example of this naming convention's use is as follows: LCRLAB_LCR_19MAR2017

Sample Table

Table 4 contains information about the sample, including collection date and time, the collector, laboratory ID, sample point IDs, and the corresponding addresses where the lead and copper tap samples were taken. There is always only one record per sample. Fields must be in the order listed in the table below and each field may or may not contain data. All fields (except those marked with an "N/A") must contain either a text or numeric value for every sample taken. Except for the "Comment" field, these fields must contain only numeric or alpha characters, as designated in field descriptions. Those fields marked as "N/A" must be left blank. All fields are mandatory, even if blank, and must be in the order listed.

An EDD must be generated for all rejected samples and results. See later section on Rejecting Samples and Results.

SDWIS uses three identifiers to describe the sample location:

- Facility [B_WSF_STATE_ASSGN_ID] which for lead and copper tap samples is always DS01.
- Sample Point [B_SAMPLING_POINT] which for lead and copper tap samples starts
 with "LCR" (LCR001, LCR002, LCR003, etc.). These can be found in DWW. The PWS
 is required to fill out the LCRCOC with the sampling points when submitting
 samples.
- Sample Location [B_SAMPLING_LOCATION] which for lead and copper tap samples is always an address or inside tap like kitchen sink or bathroom sink.

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
1	FILE_NAME	Default to "sample"	Text	6
2	B_RECORD_ID	Auto number, unique	AutoNumber	7
3	B_LAB_SAMPLE_NUM	Laboratory sample ID number	Text	20
4	B_STATE_SAMPLE_NUMBER	N/A		
5	B_PWS_NUMBER	PWS ID number, precede with "TX"	Text	9
6	B_REPLACEMENT_INDICATOR	"Y" if sample replaces a previously rejected sample, otherwise defaults to "N." If "Y", populate field 24, 25, 37, 38.	Text	1
7	B_LABORATORY_CERTIFYING_AGENCY	"State" if accredited by TCEQ, "Federal" if certified by EPA	Text	7
8	B_LABORATORY_CERTIFICATION_ID	Lab Accreditation or Certification ID Number. Check with TCEQ for laboratory unique number	Text	15
9	B_WSF_STATE_ASGN_ID	Water System Facility, always use "DS01" for lead and copper tap samples	Text	12
10	B_SAMPLING_POINT	Sample Point, LCR001, LCR002, LCR003, etc. Sample point should match label on bottle and what is in SDWIS. This is provided to the lab by the PWS	Text	12
11	B_SAMPLING_LOCATION	Address and location of Sample Point i.e., kitchen sink, bathroom sink, 123 Main Street = should correspond to LCR001, LCR002, LCR003, and what is in SDWIS (Note: no special characters, like commas, periods, number signs, etc. should be included in this field.)	Text	40
12	B_SAMPLE CATEGORY	Default to "PB" for Lead and Copper	Text	2
13	B_COMPLIANCE INDICATOR	"Y" for yes or "N" for no	Text	1

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
14	B_COLLECTION_DATE	Collection date as text in the following format – MMDDYYYY	Text	8
15	B_COLLECTION_TIME	Collection time (24 hour clock) as text in the following format – HH:MM:SS	Text	8
16	B_SAMPLE_TYPE	"RT" = routine for lead and copper	Text	2
17	B_REPEAT_LOCATION	N/A		
18	B_LAB_RECEIPT_DATE	The date the lab received the bottles formatted – MMDDYYYY	Text	8
19	B_COLLECTOR_NAME	First and last name of sample collector if known	Text	40
20	B_SAMPLE_VOLUME	mL of sample submitted	Number	4
21	B_LEAD_COPPER_SAMPLE_TYPE	"FSD" always, means First Draw	Text	10
22	B_SAMPLE_REJECTION_REASON	Rejection Code if applicable=see table of Rejection Codes	Text	2
LCR A	B_COLLECTION_METHOD_CODE	N/A		
24	B_ORIGINAL_LAB_SAMPLE_NUMBER	Original lab sample ID number (if replacing a previously rejected sample)	Text	11
25	B_ORIGINAL_COLLECTION_DATE	Original collection date (if replacing a previously rejected sample) - MMDDYYYY	Text	8
26	B_LAB_COMPOSITE_NUMBER	N/A		
27	B_COMPOSITE_DATE	N/A		
28	B_FREE_CHLORINE_RESIDUAL	N/A		
29	B_TOTAL_CHLORINE_RESIDUAL	N/A		
30	B_SAMPLE_WATER_TEMPERATURE	N/A		
31	B_TEMPERATURE_UNIT_MEASURE	N/A		
32	B_TURBIDITY_MEASURE	N/A		
33	B_PH_MEASURE	N/A		
34	B_FLOW_RATE	N/A		
35	B_SAMPLE_PURPOSE	N/A		
36	B_STATE_CLASSIFICATION_CODE	"LC" = Lead and Copper default	Text	2
37	B_ORIGINAL_LABORATORY_CERTIFYIN G_AGENCY	Original laboratory accrediting or certifying agency (if replacing a previously rejected sample). "State" = default	Text	8
38	B_ORIGINAL_LABORATORY_CERTIFICA TION_ID	Original lab accreditation or certification ID located on the LCRCOC (if replacing a previously rejected sample)		

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
39	B_SAMPLE_COMMENTS	Comments related to the entire sample (pass thru lab information)	Text	255
40	B_COLLECTION_ADDRESS	Address or description of sample Site. This is a repeat of what was placed in table B_SAMPLING_LOCATION	Text	200

Result Table

The result table contains the individual analyte results. See Table 5. There may be multiple records depending on how many constituents were analyzed in the particular water sample (two for lead and copper). A result record should only be created if a result is available. If an entire sample is rejected and not analyzed, no result records should be reported, only report the single sample record. **Note**: Unit concentrations for lead and copper must be reported in mg/L.

Fields must be in the order listed in the table below and each field may or may not contain data. All fields (except those marked with an "N/A") must contain either a text or numeric value for every sample collected as designated in field descriptions. Those fields marked as "N/A" should be left blank. All fields are mandatory, even if blank, and must be in the order listed.

Table 5 Result File Structure

No	Field Name	Description	Data Type	Field Size
1	B_FILE_NAME	Default to "result"	Text	6
2	B_RECORD_ID	Auto-number, unique	Auto Number	7
3	B_LAB_SAMPLE_NUM	Laboratory sample ID number, unique	Text	20
4	B_COLLECTION_DATE	Collection date as text in the following format - MMDDYYYY	Text	8
5	B_PWS_NUMBER	PWS ID number, precede number with "TX"	Text	9
6	B_LABORATORY_CERTIFYING_AGEN CY	"State" if accredited by TCEQ, "FEDERAL" if certified by EPA	Text	7
7	B_LABORATORY_CERTICATION_ID	Lab ID number; check with TCEQ	Text	15
8	B_ANALYTE_CODE	EPA analyte code, 1030=lead and 1022=copper	Text	4
9	B_ANALYSIS_START_DATE	Date analysis is started as text in the following format: MMDDYYYY	Text	8
10	B_ANALYSIS_START_TIME	Time analysis is started as text in the following format: HH:MM:SS	Text	8
11	B_ANALYSIS_COMPLETE_DATE	Date analysis ends as text in the following format: MMDDYYYY	Text	8

Table 5 Result File Structure

No	Field Name	Description	Data Type	Field Size
12	B_ANALYSIS_COMPLETE_TIME	Time analysis ends as text in the following format: HH:MM:SS	Text	8
13	B_STATE_NOTIFY_DATE	Date data are reported to TCEQ as text in the following format: MMDDYYYY. If the data are rejected and returned for correction, use the current date when re-submitting.	Text	8
14	B_WATER_SYSTEM_NOTIFY_DATE	Date data are reported to the public water system as text in the following format - MMDDYYYY	Text	8
13	B_DATA_QUALITY	Default to "A" for acceptable	Text	1
16	B_DATA_QUALITY_REASON	N/A		
17	B_ANALYSIS_METHOD_CODE	Analysis method code-see lead and copper approved Methods	Text	30
18	B_VOLUME_ASSAYED	N/A		
19	B_LAB_REJECTION_REASON	Rejection reason specific to results (if applicable)	Text	2
20	B_MICROBE_PRESENCE_INDICATOR	N/A		
21	B_COUNT	N/A		
22	B_COUNT_TYPE	N/A		
23	B_COUNT_UNITS	N/A		
24	B_LESS_THAN_INDICATOR	Populate with "Y" if the result is less than the laboratory MRL. Populate with "N" if a concentration is reported.	Text	3
25	B_LESS_THAN_CODE	Populate with the term "MRL" if field 24 is "Y." Do not populate if field 24 is "N".	Text	3
26	B_DETECTION_LEVEL	Populate with the actual laboratory MRL.	Number	N/A
27	B_DETECTION_LEVEL_UNIT_CODE	Populate with "mg/L" if field 24 = "Y."	Text	10
28	B_CONCENTRATION	Populate with concentration if field 24 = "N"	Number	Doubl e
29	B_CONCENTRATION_UNIT_CODE	Populate with concentration units (mg/L) if field 24 = "N"	Text	9
30	B_REPORTED_MEASURE	N/A		
31	B_REPORTED_MEASURE_COUNT _ERROR	N/A		
32	B_COMMENT	Comment specific to result	Text	254
33	B_STATE_SAMPLE_NUMBER	N/A		

Reporting Rejected Samples and Results

Each laboratory is responsible for the rejection of samples and invalidation of results that do not meet requirements according to TCEQ guidance. Laboratories may reject samples or results in coordination with the TCEQ and the PWS. If a sample has been delivered to the laboratory, the rejected samples/results must be reported to the TCEQ electronically via SDWIS in all cases. Table 6 lists description codes for rejecting both samples and results. The rejection "description" dictates whether it is reported on the SAMPLE table or the RESULT table.

For example, samples must be preserved within 14 days of collection (14 24-Hour periods). If a sample is delivered in excess of that time period, the lab should reject the sample, request a replacement. The sample rejection is reported to the TCEQ electronically with the sample table completed but no results. The rejection code "EH" for "exceeds holding time" will be used in Line 22 of the Sample Table. When the replacement sample is resubmitted, Lines 24 and 25 of the sample table will be completed with the original sample number and the original collection date. This will "tie" the original sample to the replacement.



Table 6 Lead and Copper Rejection Codes

TEXT_VALUE	DESCRIPTION
BR	Broken container
EH	Exceeds holding time
EV	Excessive Volume
FZ	Frozen sample
HS	Excessive headspace
IC	Invalid container used
ID	Invalid date/time
IN	Insufficient information
IP	Invalid sampling protocol
LA	Lab accident
LE	Lab error / Lab QC failure
LT	Leaked in transit
MF	Submission form and chain of custody do not match
ND	No date/time (missing)
NR	No sample received
PR	Improperly preserved
PS	No PWS representative signature (missing)
QC	QA/QC issue
QI	Quantity insufficient
RL	Reporting limit not met
VO	Insufficient volume

Corrective Actions (CA)

Any person involved with work described in this document must initiate a CA if there is deviation from required protocols specified in it and/or referenced documents. The procedure for a CA following the identification of a deviation begins with an investigation to determine the root cause(s). The laboratory must select and implement the CAs that will eliminate the problem and prevent recurrence. Any CAs identified must be appropriate in degree to the magnitude and risk of the deviation. Laboratory QA Officers (or designees) are responsible for assuring that CAs are documented, reported, implemented, and tracked appropriately.

Deviations that require CA include, but are not limited to the following:

- Equipment failure
- Excursions from quality control limits
- Samples lost due to laboratory accidents
- Failure to meet acceptance limits when analyzing EPA Proficiency Test samples
- Holding time exceedances

Most CAs can be accomplished at the point of origin using an established procedure through some combination of the following: repair or replacement of faulty equipment; reanalysis of samples and standards; checking reagents for proper strength; etc. CA procedures/response actions are specified in laboratory SOPs that include required documentation, solutions, and follow-up.

Unique deviations/problems that cannot be corrected by the procedures listed above will require CAs to be defined when the need arises.

If laboratory deviations involve the following list, the laboratory QA Officer must notify the PWSS Program QA Manager by phone or e-mail within 48 hours, draft a CA report, and submit it to the PWSS Program QA Manager within 14 days of the incident detection.

- Calls into question the integrity of sample analysis results which have been previously reported to the TCEQ
- Results in non-conformance with state or federal regulations
- Was associated with the intentional misrepresentation of data or information

<u>CA Reports include the following components:</u>

- Description of the problem how it was identified and the date it was identified
- Root cause
- Description of the significance or consequences of the deviation
 – include sample ID number(s) affected
- CA(s) taken, including the timetable for implementation
- Actions implemented to prevent recurrence;
- Technicians/staff names (or job titles) involved
- Who prepared the report
- A review process with signatures and dates that includes a manager(s)

The TCEQ will review each CA report to determine if actions taken to resolve the deviation are acceptable. If CAs taken by a laboratory are unacceptable to the TCEQ, the TCEQ may not use sample results from the laboratory until such time that acceptable CA is achieved.

Corrected data must be submitted in a completely separate file from routinely submitted data. The laboratory must notify the TCEQ in advance in order to prevent duplication in the database of record.

Maintenance of Records

The laboratory must maintain easily accessible records on its premises or at a convenient location near its premises for five years. Adequate information should be available to allow an auditor to reconstruct the final results for compliance purposes. Changes in ownership, mergers, or closures of laboratories do not eliminate these maintenance requirements for data. The laboratory must notify the PWS before disposing of records < five years old so they may request copies if needed. This includes all raw data, calculations, and QC information. If the laboratory changes its computer hardware or software, it should make provisions for transferring existing data < five years old to be retrievable in the timeframe listed above.

Exhibit: 1 Lead and Copper Rule Chain of Custody Form 20683

	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY LEAD AND COPPER RULE—CHAIN OF CUSTODY FORM 20683														
TCEQ	TCEQ LEAD AND COPPER RULE—CHAIN OF CUSTODY FORM 20683														
PWS Name:				Ccompliano	æ Samples (√)					Lab ID:					
PWS ID #:				Non-Compliance Samples (√)						Lab Name:					
PWS Contact Name:										Lab Contact Name:					
PWS Contact Phone			# of Pages Submitted:						Lab Phone:						
Sample Point ID #	Sample Location			Water Last Used Date (MMDDYY)	Water Last Used Time (HHMM)	Sample Collected Date (MMDDYY)	Sample Collected Time (HHMM)	Original Lab Sample ID #	Original Collection Date (MMDDYY)	Lab Sample ID #	Analysis Date (MMDDYY)	Analysis Time (HHMM)	Lab Preservation Date (MMDDYY)	Lab Preservation Time (HHMM)	Collection Time (HHMM)
I acknowledge that the information on this form is true and correct. Sites selected for sampling follow the approved Lead/Copper Sample Site Se Pool and Materials Survey (TCEQ 20467) and the PWS Monitoring Plan.										CONDITIONS UPON RECEIPT Samples in 1-L labeled plastic bottles (v')					
									Samples Received Unpreserved (√)		PWS Portion of Form Complete (√)				
Name (PWS Representative)		Signature					Date			Samples Received and Preserved within Required Hold Times (√)		Sample Temperature Upon Receipt (°C)		ture Upon	
										Sample Preservation:	Time			D ate	
Relinquished by:		Signature Date						Date	Time	Received by: Name	Signature D			Date	Time
Comments										Comments					
For TCEQ only:	QA/QC		Accepted (√)		Rejected (√)		Date		Time	TCEQ Staff Name					
TCEQ Comments:															
IMPORTANT: THIS FOI INCOMPLETE FORMS.	RM MUST A	COMPANY	THE SAMPLE BOT	TLES WHEN T	HEY ARE SENT T	O A LABORAT	ORY FOR ANA	LYZING. SAMPLE	S EXPIRE 14 (24-	HOUR PERIODS) DAYS AFTER COI	LECTION IF NOT	PRESERVED	. THE LABORATO	RY IS INSTRUCT	TED TO REJECT
TŒQ-20683 (06/14/201	7)														



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY LEAD AND COPPER RULE - CHAIN OF CUSTODY FORM 20683 INSTRUCTIONS

INSTRUCTIONS: All unshaded columns and spaces must be completed or laboratory will reject. Left side to be filled out by PWS and right side by laboratory.

Public Water System (PWS) to fill out the following fields.

PWS ID: Public water system identification number

PWS Name: Public water system name

PWS Phone: Public water system phone number

PWS Representative: Certified Operator or Responsible Person who either took samples or is responsible for the samples

Complaince Samples: Check the box if these are compliance samples

Non-Compliance Samples: Check the box if these are non-compliance samples

of Pages Submitted: The # of pages of LCR/site location/ addresses you are including with bottles. Each page has 5 address possibilities.

Sample Point ID Number: DS01 for distribution lead and copper tap water samples, EP001, EP002, etc. for entry point lead and copper samples

Sample Location: Address and sink type-found in Texas Drinking Water Watch under Sample Points; example-123 Main Street, kitchen sink for First Draw Samples or location of entry point for non-first draw samples.

Water Last Used Date: The date water was last used at this sink, use Homeowner paperwork and use MM/DD/YY format

Water Last Used Time: The time water was last used at this sink, use Homeowner paperwork and use HH/MM format

Sample Collection Date: The date sample was collected by PWS or homeowner. Please use MM/DD/YY format.

Sample Collection Time: The time sample was collected by PWS or homeowner. Please use 24 hour clock when reporting HH/MM.

Original Lab Sample ID: If the sample is a resample, please add the original laboratory sample ID # (this can be done by laboratory or by PWS)

Original Lab Collection: If the sample is a resample, please add the original laboratory collection date and time (this can be done by laboratory or by PWS)

PWS Name/Signature/Date/Time: PWS authorized representative name, signature, and date
Relinquished By: The person(s) relinquishing samples name, signature, date, and time.

telinquished by: Ine person(s) relinquishing samples name, signature, date, and time

PWS Comments: Use this field for any comments that need to be added.

Laboratory to fill out the following fields.

Lab ID: NELAP Accredited Laboratory / SDWIS identification number (check with TCEQ if you are not sure)

Lab Name: Laboratory name

Lab Contact Name Laboratory contact name (for questions about analysis)

Lab Phone: Laboratory phone number
Lab Sample ID: Laboratory generated sample ID.

Lab Sample ID: Laboratory generated sample ID.

Analysis Date: Enter the analysis date. Please use MM/DD/YY format.

Analysis Time: Enter the analysis time. Please use HH/MM format.

 Lab Preservation Date:
 Enter the date the lab preserved the sample. Please use MM/DD/YY format

 Lab Preservation Time:
 Enter the time the lab preserved the sample. Please use HH/MM format.

Collection Time:

Conditions Upon Receipt Upon receipt check the following:

Samples in 1-L labeled plastic bottles (v) Check the box if samples were received in properly labeled 1-liter plastic bottle-check the box for Yes. Reject the sample if the answer is No. Add notes in the comments section.

Samples Received Unpreserved (√) Check the box if samples were received unpreserved

Check the box if the PWS portion of the form is complete. If Form 20683 is submitted to a laboratory incomplete (meaning any PWS information incomplete), the laboratory is required to reject back to PWS; check

PWS Portion of Form Complete (√) box if form complete; of not reject back to PWS

Samples Received and Preserved within

Required Hold Times (🗸) Check the box is samples were received and preserved within the required hold times

Sample Preservation Date and Time Enter the date and time the sample was preserved in the lab using MM/DD/YY and HHMM form at.

Samples Received by Name, signature, date, and time of the person receiving the samples at the laboratory.

Laboratory Comments: Add any comments about samples, preservation, conditions upon receipt, etc.

Temperature Upon Receipt Record the temperatures upon arrival at the laboratory. If the temperature of the samples is less than 6°C accept the samples; temperature greater than 6°C reject the samples.

Samples Received Unpreserved Check the box if the samples were received unpreserved. If the samples are preserved by the sampler, reject the sample.

Laboratory Sample Preservation Date/Time Record the date and time the samples were preserved at the laboratory.

Texas Commission on Environmental Quality

PO BOX 13087, Lead and Copper Program, Austin, Texas 78711-3087

Telephone: 512-239-4691, Fax: 512-239-6050